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Name of applicant, assignee or Registered Representative

*Stephanie J. Felicetty*

Signature

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Date of Signature

**Case No. 4865/133 (202WB036)**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Nixon et al.	
Serial No.: 10/693,425	Examiner: Group, Karl E.
Filing Date: October 24, 2003	Group Art Unit No.: 1755
For: BORON CARBIDE BASED CERAMIC MATRIX COMPOSITES	

**DECLARATION OF THOMAS D. NIXON, PH.D. UNDER 37 C.F.R. § 1.132**

Mail Stop AF  
Commissioner for Patents  
Alexandria, VA 22313-1450

Dear Sir:

I, Thomas D. Nixon, do declare and state as follows:

1. I am one of the inventors in the subject patent application, Serial No. 10/693,425 ("Goodrich application"), and I am familiar with the contents of the application.

2. During the time that I contributed to the invention described and claimed in the Goodrich application and continuing to the present, I have been employed by the Goodrich Corporation, the assignee of the application.

3. I understand that the Examiner has rejected the subject application over U.S. Patent No. 6,537,654 ("Gruber"). I also understand that the Examiner has requested tangible evidence to show that following the teachings of Gruber produces a product with a silicon carbide grain size above the range specified in all of the claims of the Goodrich application.

4. In view of this request, I have attempted to duplicate the material disclosed in Gruber, i.e. to make a "Gruber sample." Unfortunately, the Gruber reference does not set forth every parameter needed to make the sample. Thus, in order to make the comparison more demanding, we used parameters from our own process described in the Goodrich application up to the point of the silicon melt infiltration. We then conducted the silicon melt infiltration step using the melt infiltration temperature set forth in Gruber. The details of the process we used to make the Gruber sample are set forth in the following paragraphs.

5. First, we started with a standard carbon fiber preform used in the commercial manufacture of Goodrich carbon/carbon aircraft brake products and having a fiber volume of about 23% to about 26% carbon.

6. Carbon was added to this preform by chemical vapor infiltration until the preform had a density in the range of about 1.25 g/cm<sup>3</sup> to about 1.35 g/cm<sup>3</sup>. This

density range has been found to be acceptable for the invention disclosed in the Goodrich application.

7. A ceramic slurry of boron carbide having an average particle size of less than one micron (as used in the Goodrich invention) was then added to the material by a slurry casting process.

8. Next, the material was impregnated with liquid naphthalene, a liquid carbon precursor, as described in the Goodrich application.

9. The processing was completed using the silicon alloy melt infiltration temperature set forth in Gruber (see Gruber et al, Col. 15, ln. 36). In particular, we conducted the infiltration with liquid silicon under vacuum in a high temperature furnace. We used a temperature ramp profile that coincided with our furnace capabilities (approximately 0.5°C/min to 2.5°C/min) to achieve a melt infiltration temperature of approximately 1800°C, as set forth in Gruber. We found it necessary to add a 30 minute hold at 1500°C in order to prevent failure of the thermocouple used in the experiment. We held the sample at 1800°C for approximately 30 minutes. Finally, we allowed the sample to undergo uncontrolled cooling.

10. The resulting Gruber sample was characterized using optical microscopy. Copies of polarized light optical photomicrographs of the Gruber sample are attached at Tab 1. As can be seen in these photomicrographs, the Gruber sample contained many large silicon carbide particles having a grain size of greater than 50 microns. The photographs attached at Tab 1 are known to me to be true copies.

11. I declare that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the above application or any patent granted therein.

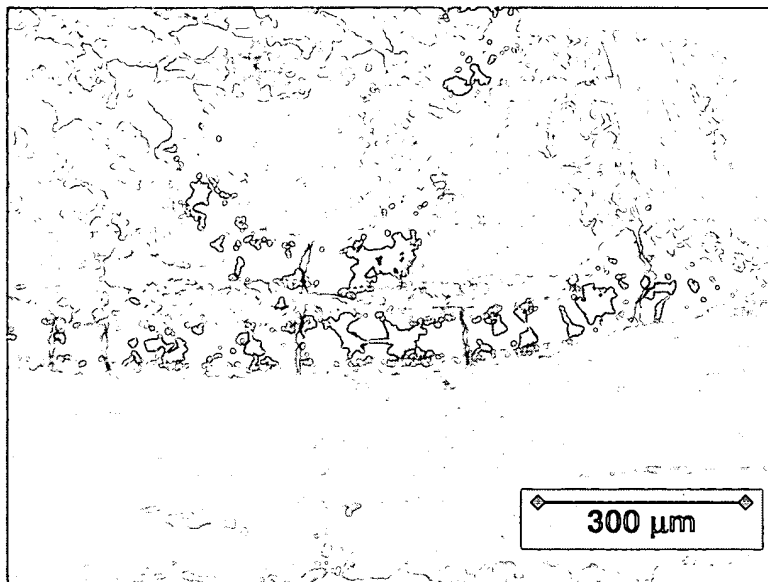
Dated: 10/31/2006

Thomas D. Nixon  
Thomas D. Nixon

**TAB 1**



Gruber Sample  
Low Magnification



Gruber Sample  
Medium Magnification

